



Algorithm Transition Process

Presented by

Walter Wolf

**STAR JPSS Algorithm Integration Team Lead
NOAA/NESDIS/STAR**



AIT Overview

- The AIT performs the necessary role of efficient and accurate transfer of scientific information into functional software systems
- The AIT provides the experience and expertise to eliminate the many pitfalls associated with the transition of scientific software thus enabling a smooth transition of these science software systems to the JPSS Ground Segment
- The smooth transition of the science software systems to the JPSS Gound Segment enables Raytheon to focus on the operationalization and implementation of the algorithms into the IDPS



AIT Overview

- The AIT consists of two parts of one team:
 - DPES AIT led by Pat Purcell
 - STAR AIT led by Walter Wolf
- This presentation focuses mostly on the algorithm implementation within ADL.



DPES JAMs and STAR AIT POC

Algorithm	JAM	STAR AIT POC
VIIRS GEO	Rosalie Marley	Bigyani Das
VIIRS SDR	Rosalie Marley	Marina Tsidulko
CrIS SDR	Carrie Root	Bigyani Das
ATMS SDR	Lance Williams	Bigyani Das
Cloud Mask IP	Bill Thomas	Weizhong Chen
Cloud EDRs	Janna Feeley	Weizhong Chen
Land	Leslie Belsma	Youhua Tang
SST	Rosalie Marley	Youhua Tang
Ocean Color	Rob Williamson	Youhua Tang
Imagery EDRs	Ryan Williams	Marina Tsidulko
Aerosols	Ashley Griffin	Bigyani Das
Cryosphere	Paul Meade	Marina Tsidulko
CrIMSS EDR	Richard Cember	Bigyani Das
OMPS (SDR & EDR)	Maria Caponi	Bigyani Das
STAR ClearCase CM		Yunhui Zhao



Change Process

- **Discrepancy Report**
- **Algorithm improvements/fixes/updates**
- **Algorithm Change Package Submitted**
- **G-ADA Testing**
- **AERB Disposition**



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Benefit of AIT-Assisted Transition

- Maintain scientific integrity
 - Ensure that the integrated algorithm produces the same result as the offline version of the algorithm
- Meet operational needs
 - Ensure that the algorithm meets the operational requirements; that it is part of the development of the algorithm, not an afterthought
- Consistency in delivered products across teams
 - Ensure that the deliveries contain the same materials with the same details across all algorithm teams
 - Ensure that the algorithm updates do not negatively affect chained algorithms



Mitigation of Transition Issues

- The AIT performs the “behind the scenes grunt work” associated with the delivery of scientific algorithms
 - Integrators work directly with the algorithm team on a daily basis
 - Alignment of science algorithm to transitioned algorithm
 - Same science, same answers
 - Software standards
 - Algorithm package creation and delivery
 - Coordination of input data sets between algorithms
 - Software development and/or maintenance associated with operational data formats
 - Lead the Process Reviews
 - Schedule development support



What STAR AIT Does

- Attend weekly meetings with SDR and EDR teams
- Assist teams with code updates, testing, and deliveries
- Provide technical support and expertise to teams
- Along with DPES AIT, serve as ADL experts
- Provide avenue for effective offline configuration management
- Facilitate a structured test and review process for new algorithms
- Open communication between all the stakeholders



Current Activities – ADL

- Work with the algorithm teams:
 - Maintain algorithms within the ADL
 - Provide software support for ADL modifications and/or surrounding ADL software for the algorithms
 - Provide software support for algorithm testing within the ADL
 - Coordinate algorithm baselines between the algorithm teams and the IDPS
 - Merge offline algorithm modifications with the IDPS baseline algorithm within the ADL
 - Provide day to day software support for all ADL algorithm interfaces



Current Activities – ADL (cont.)

- Work with the algorithm teams:
 - Provide support for code to meet the software requirements
 - Evaluate, examine, and accept deliveries of the product teams and integrate them into the ADL according to the approved schedule
 - Coordinate all the input data required to run the algorithms
 - Conduct the test runs of the algorithms within the ADL
 - Perform V&V for all deliveries



HOW..... Configuration Management

- AIT utilizes a Configuration Management (CM) environment within STAR using IBM ClearCase and ClearQuest.
- CM is vital for implementation, controlled testing, and validation of the JPSS Algorithms.
 - Protects software assets from file corruption, unintentional changes, unauthorized access, and software loss.
 - Provides the ability to reproduce the configuration of the entire development environment.
 - Controls the flow of changes among development branches.
 - Enables algorithm developers to use the most recent algorithm updates provided by other algorithm teams.



How..... Algorithm Management

- MX Builds (from Common CM) and ADL Releases (from Wisconsin) are input into ClearCase
- AIT works on a branch off the baseline
- Algorithm teams work off the AIT branch in a development branch
 - Algorithm updates outside of the ClearCase managed software will be implemented into ClearCase by STAR AIT
- Algorithm deliveries are made to AIT branch
 - STAR AIT tests algorithm changes
 - STAR AIT reviews software for standards compliance and updates software
 - DPES AIT is informed that an algorithm package is coming soon



How..... Algorithm Management

- AIT provides test results to algorithm team
- Algorithm changes submitted to CM baseline
- Algorithm package put together and delivered
- DPES AIT performs G-ADA tests
- STAR AIT performs algorithm chain runs in parallel and provides outputs to both the algorithm team and all algorithm teams down the chain
- New MX Builds and ADL Releases are input into ClearCase and the current working AIT branches are merged into the new software baselines



Chain Scripts and Training

- Chain Scripts make running the ADL easier
 - User specifies the algorithm to be run and the date of the data
 - Scripts will find the correct data, including LUTs within the STAR collaborative environment
 - Run by STAR AIT when each algorithm package is delivered
- Chain Scripts are also maintained within ClearCase
- AIT will provide training for Chain Scripts
- AIT will provide training for STAR CM usage



Algorithm Packages

- The Algorithm Package deliveries will be consistent between products
- All Algorithm Package Deliveries will include all algorithms delivered since the last MX Build has been released
- Therefore, each Algorithm Delivery will contain the most up to date science



Communication

- Communication between the algorithm teams when algorithms are updated
 - Chain run results for algorithms down stream of updated algorithms
- Communication with DPES AIT for incoming deliveries
 - Preparation for G-ADA test runs
- Communication with Raytheon
 - When a CCR is put in place, there should be no surprises
 - Constant communication and passing of information throughout the DR process
 - New development requires reviews that Raytheon will be part of as stakeholders
 - Information on algorithm changes that affect the CGS infrastructure will be provided early in the development process
 - Collaborate with Raytheon on any changes that affect the CGS infrastructure



Raytheon Needs to Know: Anything to do with the Algorithm Interface with the IDPS



- Input data sets required
 - Ancillary data sets
 - LUTs – New or modified (dimension changes)
- Algorithm interface changes (new inputs to algorithm)
- Processing time and memory usage
- Output file variable changes
- Awareness of algorithm implementation choices
 - Use of currently implemented ancillary datasets is strongly recommended
- Delivery Dates



Summary

- AIT will ensure that there is a smooth transition of algorithms from the algorithm teams to the JPSS Ground Segment
- The AIT will eliminate the transition pitfalls that are generally encountered during an algorithm transition process:
 - Maintaining scientific integrity
 - Meeting the operational needs
 - Consistently between the delivered algorithms